Engineers
Planners
Economists
Scientists

October 22, 1990

DEN30181.F1.PM

Ms. Karen Lewis
NEPA Project Manager
EG&G Rocky Flats, Inc.
P.O. Box 464
Golden, CO 80402-0464

Dear Ms. Lewis:

Subject: OU7 RF1/R1 Workplan Review;
Response to Comments

Attached are 15 copies of our revised comments for the OU7 RF1/R1 Workplan. The comments were revised based on your comments received October 1, 1990, our meeting of October 8, 1990, and further clarification received via our phone conversation of October 18, 1990.

These copies replace those delivered to you on October 19, 1990. Please return the copies to us for recycling, or recycle them at your office. I apologize for the delay in delivering the complete report to you. I was unable to get an adequate response developed for comments 3-1, 3, 22, and 5-1, 2, 13 until Monday, October 22. The remainder of the report is the same.

CH2M HILL Rocky Mountain Office 6060 S. Willow Drive, Greenwood Village, Colorado 80111-5112
Mailing address: P.O. Box 22508, Denver, Colorado 80222 303.771.0900

Please contact me at 771-0952, extension 2324 with questions.

Sincerely,

CH2M HILL

Beth A. Baruth
Task Manager

DEN/ROCKY6/018.51/drm
cc: Tom Kuebrich/IT Corporation
Brian Rothman/IT Corporation
Joan Miller/CH2M HILL (w/o attachment)
Sandy Tauer/CH2M HILL/Project RMS
Charlie Krogh/CH2M HILL (w/o attachment)

RFI/RI WORKPLAN REVIEW FOR RISK ASSESSMENT AT OPERABLE UNIT 7 LANDFILL

Section 1
OBJECTIVE

This report includes an evaluation of the Operable Unit 7 Landfill RFI/RI Workplan relative to its adequacy for performing the Baseline Risk Assessment (Technical Requirement III. A. of the Statement of Work). This report also includes a proposed schedule and cost measurement data for completing the human health portion of the Baseline Risk Assessment (Technical Requirement III. B).

BACKGROUND

A Baseline Risk Assessment is to be performed for each operable unit to:

- Identify and characterize the toxicity and levels of hazardous substances present
- Assess and characterize contaminant fate and transport
- Assess the potential for human or environmental exposure, or both, whether the impacts are direct or cumulative
- Assess the risk of potential impacts or threats on human health and the environment whether the impacts are beneficial or detrimental

The Baseline Risk Assessment shall provide the basis for determining the need and justification for Corrective/Remedial Actions.

The RFI/RI Workplan for Operable Unit 7, Landfill was reviewed relative to requirements set forth in EPA's Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (EPA/540/1-89/002) (RAGS) and the requirements of the Interagency Agreement (IAG). The Workplan reviews did not consider environmental (ecological) impacts, although some references to them are made in the comments.

The review included evaluation of Volumes I and II of the Workplan. No review of the Laboratory Analytical Protocols was requested or performed. The review includes a qualitative examination of the spatial distribution of samples, given the constraints

previously noted. No statistical analysis of sample distribution was requested or performed.

RESULTS

The results are presented in two sections, RFI/RI Workplan Review and Proposed Schedule and Cost. The review comments on the RFI/RI Workplan and presented in detail in Section 2. Section 3 presents a proposed schedule and cost estimate for performing the human health portion of the Baseline Risk Assessment.

In summary, comments note a number of inconsistencies within the Workplan, especially relative to chemicals of concern. In general, comments indicate that revisions to the REI/RIFS are required in order to collect data adequate to perform the Baseline Risk Assessment.

Section 2

RFI/RI WORKPLAN REVIEW

In this section, general comments that apply to the overall Workplan document are presented first. Then, specific comments are presented by page number, paragraph, and line.

GENERAL COMMENTS

1. It is unclear from the language and references in the Workplan, whether this investigation and the remediation are to be conducted according to CERCLA or RCRA or a combination of the two. Table 6-1 of the Workplan lists the EPA guidance documents to be used in conducting the risk assessment. These documents are all CERCLA documents, and the risk assessment will be performed in accordance with these guidelines.

   In addition, Table 6-1 lists the Endangerment Assessment Handbook as a guidance document for the risk assessment. EPA has stated that the Risk Assessment Guidance for Superfund (RAGS) supersedes all other documents and that the Endangerment Assessment Handbook should not be used.

2. Chemicals and contaminants of concern appear and disappear in various sections of this document (e.g., chloroform, asbestos and hydraulic fluids). This is also true of the various media of concern. It is impossible to determine the contaminants of concern and important media because of the inconsistencies between text references and sampling results, etc. In addition, in the text portion of this document concentration levels for contaminants are not presented. This made it difficult to assess the conclusions of statements regarding the various contaminants of concern. The inclusion of a table, listing the potential contaminants of concern based on sampling to date in the various media of concern, would help to alleviate the inconsistencies. Inclusion of contaminant concentrations in the text provides for a more unified document which can more readily stand alone.

3. Biota and the ecology/environmental risk must be considered in this document and in the RFI/RI process. Consumption of biota is not considered as a route of exposure and should be since it is a probable link between the environmental pathway and human health effects. Several of the species identified in Section 1.3.4 are game species which may be consumed by humans. This receptor/exposure pathway should be added to Table 2-11. The human health aspects of consuming contaminated game animals would not be dealt with in the Environmental Evaluation.

4. There are numerous documents (e.g., Landfill Closure Plan; DOE, 1980; SAP; SOP) that were not reviewed as part of the Statement of Work. This highlights a major difficulty involved in evaluating this document. In order to gain an accurate representation of the site and to evaluate the risks posed to human health and the environment, it is necessary to integrate all available information. Information about the hydrogeologic assessment must be provided in the Workplan in order to formulate an efficient and useful sampling plan. All information about sampling procedures, analytical techniques, etc., are used to assess the quality of the data upon which the risk assessment is based. It is necessary to integrate all the critical components to provide an accurate, useful evaluation of this Workplan. Without reviewing the above-mentioned documents, this review is constrained and incomplete, relative to the Baseline Risk Assessment.

5. The Workplan uses the terminology "proposed concentration limits" for chemicals and other contaminants of concern quite extensively. The term "proposed concentration limit" needs to be defined to avoid misinterpretation. It is unclear how this concept is to be considered, or if it is to be considered for purposes of the risk assessment.

6. It is unclear how background concentrations were derived for certain contaminants of concern, notably, radionuclides such as strontium and tritium. In addition, background for inorganics were determined, but not for organics. Background determinations may be handled differently for chemicals and radionuclides, and this needs to be resolved in the discussion of background. Background for organics needs to be established.

7. The radiological risk assessment needs to be performed according to RAGS.

8. Exposure pathway and receptor modeling will be necessary to estimate potential risks. This methodology is referenced in the Risk Assessment Guidance but is not developed in the RFI/RI work plan.

SPECIFIC COMMENTS
(PAGE NUMBER, PARAGRAPH, AND LINE)

EXECUTIVE SUMMARY

i,2,7--Phase I will also consider human exposure through contaminated groundwater and surface water, airborne particulates and vapors and contaminated game animals.

i,3,19-21--Some of these "hazardous waste constituents," such as asbestos and carbon tetrachloride, do not appear again for some time, if at all. The "hazardous waste constituents" need to be identified more specifically than "paints, solvents, degreasers"

for the Workplan with the stipulation that the list may change as more information becomes available.

ii.2.19--Strontium appears to be considered as merely a mineral/major ion component of groundwater. Documentation is required to support the idea that strontium is not a site contaminant.

ii.2--This paragraph reads as though groundwater is the only medium of concern. This should be rewritten to avoid misinterpretation. As noted previously, air, soil, and biota also may constitute media of concern. The rationale for selecting media of concern needs to be included in the discussion.

iii.2, statement 1--Implies that it is known that water is in the landfill and is the primary phase (i.e., aqueous versus nonaqueous). How do we know this for certain without adequate documentation in the Workplan? Explain in more detail.

iii,2, statements 4 and 5--There needs to be some clarification of the conclusion that contamination is primarily in the surface soil when soil contamination data are nonexistent to avoid misinterpretation.

iv, 2, 6-7--There are established methods for quantitating landfill contaminants. There may also be methods for quantitating general landfill materials. This needs to be further investigated to be able to rule out this possibility.

1.0 INTRODUCTION

1-1, 1 and 2--A sentence should be added to this section stating that the risk assessment will be conducted according to RAGS.

2.0 PRELIMINARY SITE CHARACTERIZATION

2-3, 2--Spraying is still being practiced, but the air exposure pathway is not considered in the assessment and needs to be addressed.

2-5, 5, 24--Since earlier soil gas measurement points were "improperly located," new samples need to be collected under a revised sampling plan with properly located samples.

2-8, 2, 5--These secondary fill materials may contain PAHs from asphalt, asbestos, and plasticizer/plastics components which may be contaminants of concern. Sampling and analysis should include these compounds. Sampling for PAHs should include media important for the risk assessment.

2-18, 1--Electrical components and sludges are characterized as "nonhazardous wastes" without any characterization. This needs to be further documented.

2-18, 4--We question this method which allows "background" levels of such materials as strontium and tritium to be subtracted from samples. If this is accepted methodology for radionuclides, this must be clarified and documented. While the detection limit for strontium is listed as 0.1 pCi/l here it is stated that all of the samples had concentrations less than 1.0 pCi/l. Subsequently, in Table 2-7 values of <3 pCi/l are not reported. This implies a detection or quantitation limit of 3. One exception to this is the sample for December 1982 which lists a value of 0.6 pCi/l. These inconsistencies should be addressed. Are the decreases in this table consistent with the half-lives of the radioisotopes? It is unclear if radioactive decay is the sole reason for the decreases seen in Table 2-7. If there are other mechanisms and/or exposure pathways, they need to be discussed. The units are missing from this table as well.

2-21, 4, 4--A statement indicating that uranium was not found in groundwater samples in 1988, but does appear in 1989, need to be addressed to this section.

2-22, 1, 1--This sentence implies that inorganic sample levels were subtracted from the "background" levels. This approach is prohibited by CERCLA. The statement needs to be rewritten to avoid any misinterpretation.

2-23, 1, 1--Chloroform is not generally considered to be a common laboratory contaminant, and the repeated occurrence of this compound in samples and blanks raises questions concerning the validity of all data. Chloroform is also, alternatively, an important contaminant and an unimportant contaminant. This paragraph needs to include further explanation and justification.

2-23, 3, 16--Gross alpha has not been previously mentioned as something of concern, although other contaminants of concern have been previously mentioned. Chemicals or contaminants of concern need to be summarized in a table in the Workplan.

2-24, 1, 3--Chloroform should be considered a site contaminant. See 2-23, 1, 1 above.

2-26, 1--The summary is not consistent with all the parts of the section (i.e., contaminants are important in one part of the section and then do not appear again). Also, no concentrations for the VOCs are given. This should be included in the summary.

2-26, 3--Gross beta is now of concern and has not been mentioned previously. This needs to be addressed to correct inconsistencies.

2-27, 2 and Table 2-10--The table is unclear in regard to whether the values presented are MCLs and/or Colorado Department of Health standards. This table is also missing analysis values for semivolatiles, PCBs and pesticides. Even if these are non-detects, they should be listed in the table. The information should be specified in the table in addition to the text.

2-28, 2, 4--We were not directed to review the Present Landfill Closure Plan (Rockwell International, 1988b) or the cited appendix and are unable to evaluate the conclusion relative to the Baseline Risk Assessment in this section.

2-30, 1--Exposure pathways are poorly developed and inadequate for use in risk assessment. They require revision and should be developed to include radiological exposure pathways.

3.0 DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

3-1, 3, 22--While "general compliance with both RCRA and CERCLA guidance" may be feasible for certain aspects of this project, the requirements for risk assessment differ substantially.

A number of differences between RCRA and CERCLA risk assessment include, but are not limited to:

- Determination and use of background concentration data
- Use of institutional controls for future use
- Calculating risks from exposure to polynuclear aromatic hydrocarbons
- Cleanup levels for lead

Differences between the assessments results from differences in EPA policies adopted by the various EPA programs. In addition, discretionary measures taken by each region may result in other differences, not only between RCRA and CERCLA, but within the programs themselves. For the baseline risk assessment to be conducted at OU 7, RAGS will be followed.

3-2--These alternatives do not speak specifically to the risk assessment process. How is risk assessment to be used in this stage? The addition of a seventh bullet stating that a primary goal of the RFI/RI will be to assess the potential threats to human health and the environment would be appropriate.

3-3, 1--The nine evaluation criteria are insufficient for outlining data requirements for risk assessment. This list is incomplete and needs to specifically address the risk assessment. RAGS should be consulted.

3-4 and 3-5--These data requirements are insufficient for the proposed tasks outlined in this document and will not provide for a thorough comparative evaluation of the technologies with respect to the risk assessment. RAGS, Part B, should be consulted.

4.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

4-1--The ARARs are being prepared as a separate document and were unavailable for consideration with the review of this Workplan.

5.0 PHASE I RFI/RI Workplan DATA NEEDS AND DATA QUALITY OBJECTIVES

5-1, 2, 13--We could not find the site-specific RFI/RI goals. The goals should be specifically identified, including how they relate to the risk assessment. For example, the general goal to characterize site physical features could be modified to characterize site physical features to identify current and potential future human and environmental receptors. Describe contaminant fate and transport could be refined to include fate and transport related to the exposure potential for current and future human and environmental receptors.

5-2, 1, 4--The data needs seem to be confined to surface soil and limited to consideration of the present concentrations. No data are presented to support this concept or to justify lack of some investigation into fate of contaminants in this medium. Fate and transport modeling should be performed in order to more accurately assess the potential for further or continuing contamination of other media due to contaminated soil.

5-2, 3, 18--The (ER) SOP was not part of this review; however, the proposed Workplan and (ER) SOP objectives need to relate to the risk assessment needs.

6.0 RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION TASKS

6-3, 3, 11--No information concerning detection limits or validation procedures was available for previously collected data. No review of this information, essential to assess the useability of this data in risk assessment, was requested or performed.

6-4, 3, 18-20--There is no consideration of organics (VOCs, semivolatiles or nonvolatiles), asbestos or several of the other contaminants previously mentioned. All contaminants of concern should be considered for the Onsite Evaluation.

6-5, 2, 12-14--This implies that the base line risk assessment has begun in Phase I. The information provided in this Workplan is inadequate to assume this. It is understood that sample collection is currently scheduled for August 4, 1992 under the current IAG Schedules.

6-5, 3, 18--Several media which have not been considered relevant earlier (air and biota) are now considered relevant. The Workplan should be consistent.

6-6, 2, 6--A baseline risk assessment is an evaluation of the potential threats to public health and the environment from the site in the absence of any remedial action. A baseline risk assessment identifies and characterizes the toxicity of contaminants of concern, the potential exposure pathways, the potential human and environmental receptors and the extent of expected impact or threat under the conditions defined for the site.

The no-action alternative assumes that no corrective actions take place and that no restrictions are placed on future use of the site. Based on the definition of no-action, the baseline risk assessment addresses potential risks from the site under current and feasible future land uses.

Results of the baseline risk assessment are used to (1) help determine whether additional response action is necessary at the site, (2) modify preliminary remediation goals, (3) help support the no-action alternative where appropriate, and (4) document the magnitude of risk at a site and the primary causes of that risk.

A preliminary risk assessment is part of the Workplan. The preliminary risk assessment should:

- Identify chemicals of potential concern
- Make a preliminary toxicity evaluation (identify standards and criteria, critical toxicity values)
- Identify potential exposure pathways
- If sufficient data is available for an exposure pathway make a preliminary risk characterization
- Identify data gaps and data needs

6-7, 1, 3--It is unclear what "risk based detection limits" actually are, and whether they are appropriate in the context of risk assessment. This should be clarified.

6-8, 2, 9--This is the first time these receptors/exposure scenarios have appeared in this document. It may be appropriate to delete this sentence. The baseline risk assessment will provide detailed analysis of exposure pathways and receptors.

6-8, last paragraph--The term "indicator chemical" should be replaced with "chemicals of concern."

6-8, 3--Although the indicator chemical concept has been utilized for prior risk assessments, current guidance from EPA Region VIII is that this process may in fact underestimate the calculation of risk. Therefore, rather than selecting an upper bound of 15 representative chemicals present at this site, all chemicals present at greater than background levels should be included as the chemicals of concern.

6-9, ARAR Analysis--The Colorado Department of Health, Air, Water, and Soil Criteria should be included in the list presented. A table similar to Table 2-12, page 2-89 of the Phase II RFI/RI Workplan for Operable Unit No. 2 should be included in this section.

6-9, 1--The State of Colorado ARARs plutonium in water and soil have more restrictive values than the bulleted items listed on page 6-9.

6-10, 2, 6--There is presently insufficient data for the quantitative risk assessment for all chemicals found at this site. Additionally, exposures by inhalation and dermal routes must not be considered independent of the quantitative risk assessment if an accurate risk assessment is to be executed. If necessary, dermal and inhalation exposures should be qualitatively discussed if data are unavailable to quantitate exposure. These problems need to be addressed in the Workplan.

6-10, toxicity values--The toxicity values listed do not apply to radionuclides. As stated previously, the presentation of the radiological risk assessment in this document needs to be expanded.

6-11, section 6.7--It is necessary to consult and reference the Risk Assessment Guidelines for Superfund (RAGS) Volume II which addresses environmental risk assessment specifically. Biomarkers and toxicological endpoints are still not appropriate comparisons for radionuclide uptake and bioconcentration in the environment, since the concentrations of radionuclides present at this site could not produce the biochemical or physiological response of chemical contaminants. The radionuclides of concern present at OU7 are plutonium and uranium, with smaller amounts of americium, and the environmental fate and transport of plutonium and uranium are well documented. It would therefore be more appropriate to develop a sampling plan in support of a future risk assessment that characterizes biological uptake of uranium and plutonium by plants and animals common to OU7 and its environs. These values should be reported in units of pCi/g of dry weight for plant mass. It would also be appropriate to segregate root samples from foliage samples for this study. These values would then be used in the pathway analysis calculations for potential human receptor impact. These values can be compared to the cancer slope factors found in Table C of the HEAST, and the latent cancer fatalities per person-rem found in the National Commission on Radiation Protection (NCRP) Biological Effects of Ionizing Radiation (BEIR IV/BEIR V) report.

7.0 FIELD SAMPLING PLAN

This section must be evaluated with reference to the OU7 SOP which was not reviewed due to its unavailability. Without this information, it is not known whether this will provide adequate data for the risk assessment. More detail should be included for the radiological characterization to be performed with a description of techniques or a reference to procedures provided in the RFI/RI work plan.

Data to be collected should be validated using the model shown in Appendix E.

7-11, 2, 11--The use of "risk" here implies that the risk is known before the samples are taken and the risk assessment performed. Use of the phrase "...potential threats to human health and the environment" is recommended.

7-11, 2, 13--It is unclear how a "70 percent chance of finding a contaminated area" is determined. Also, coolants as a waste of concern is a new occurrence.

7-14, 3, 12--Table 7.4 and 7.5 are not included with the document.

7-14, 4,20--It is necessary to use HPLC (High Performance Liquid Chromatography) water for field blanks and not distilled water. This is a standard procedure.

APPENDICES

Appendix A, 4-23, Table 4-3--Add "metals" after "total" to avoid misinterpretation.

Appendix A, 5-4, 1--Is consideration of only MCLs and CDH standards something that was agreed upon by the involved parties? This needs to be clarified.

ADDITIONAL COMMENTS; QUALITY ASSURANCE PROJECT PLAN (QAPJP)

GENERAL

1. The QAPP provides a general overview of QA/QC for sitewide RF/RIFS activities. More detail as noted in the specific comments should be added for each on-specific Workplan and field sampling plan.

2. We would like to review the GRRASP relative to data needs for the baseline risk assessment.

SPECIFIC COMMENTS

Section 3.3, 3.3.1, page 20/110--Specific risk assessment DQOs need to be developed for each WP/FSP/QAA. They need to include requirements for collecting Level IV data and specific data validation requirements relative to specific risk assessment data requirements.

Section 3.3, 3.3.5, 3.3.5.2, page 32/110--What are the EG&G internal data validation functional guidelines? Risk assessment planning requires review of the guidelines. We recommend using the EPA Functional Guidelines for assigning data qualifiers. The additional information provided by EPA qualifiers as opposed to those proposed by EG&G are considerably more useful for performing the baseline risk assessment.

Section 3.3, 3.3.6, page 34/110, Item b--Data usability criteria are different for the risk assessment. The specific criteria, relative to the risk assessment, need to be established in each WP/FSP/QAA.

Figure 8-1, page 57/110--The figure needs a footnote to explain the asterisk next to "Preservation."

Section 12, 12.3, 12.3.1, page 69/110--Second paragraph. We did not note a sufficient level of detail regarding M:TE in Section 3 as referenced. We recommend additional detail be added to the on-specific WP/FS/QAAs.

Appendix A, page A16 of A25, sixth paragraph. Numerical PARCC parameters need to be described in each on-specific WP/FSP/QAA prior to sampling. We would like to review the PARCC parameters relative to data needs for the baseline risk assessment.

Section 3
PROPOSED SCHEDULE AND COST

The proposed cost measurement data and schedule for completing the human health portion of the Baseline Risk Assessment for OU7 are included as Attachments A and B, respectively. The cost estimate, as noted on Attachment A, uses 1990 labor rates. These rates would need to be updated to reflect salary increases if the work is performed after December 24, 1990.

Most of the expense for performing the human health portion of the Baseline Risk Assessment is associated with data analysis. Because other contractors are responsible for data collection, data analysis and summary will require a high level of scrutiny and quality assurance/quality control. Cost assumptions are based on the following:

- Other contractors will provide data in a data base format, readily usable, for a risk assessment data base.

- Data provided are of sufficient quantity and quality for the risk assessment.

If these conditions are not satisfied, costs in Attachment A would require adjustment. This task also includes evaluating chemicals of concern.

The following data evaluation assumes validation is complete and the appropriate data qualifiers are assigned. The data analysis performed as part of the risk assessment, and for which costs are presented in Attachment A, includes the following:

- Evaluation of the appropriateness of analytical methods
- Evaluation of contaminant quantitation limits
- Evaluation of data qualifiers
- Identification of blank contaminants
- Background contaminant concentrations versus site-related contaminants
- Data applicability to current conditions

The objective of the data analysis is to identify the highest quality defensible data set for use in the risk assessment. Once the usable data sets are identified, further analysis is required on the most appropriate way to use the data in the risk assessment. This includes the following:

- Grouping data sets, if appropriate
- Statistical analysis and summary

Fate and transport assumes that contaminant fate and transport models will be used to extrapolate contaminant concentrations to exposure points. Although the models to be

used may be prescribed by EG&G, time and expenses are included for using the models.

The exposure assessment, which includes the toxicity assessment, will identify the potential receptors and exposure routes. The toxicity assessment will be a minimal effort assuming EG&G completes other toxicity tasks (i.e., identifying slope factors, reference doses, and developing alternate toxicity values for those chemicals lacking EPA-derived values).

The Risk Characterization subtask includes:

- Hours to perform chemical and radiological risk assessment
- Hours to prepare the draft and final versions of the assessment. Three drafts are anticipated: one for internal contractor review, one for EG&G review, followed by a draft for CDH/EPA review. The attached schedule shows completion of the draft for EG&G review.

The proposed budget also includes the necessary project management and cost and schedule control hours.

It is anticipated that the first OU risk assessment performed will be associated with the approximate costs presented in Attachment A. Subsequent assessments (which may include OU7 based on the proposed IAG schedule) should cost less because the process and expectations will be familiar.

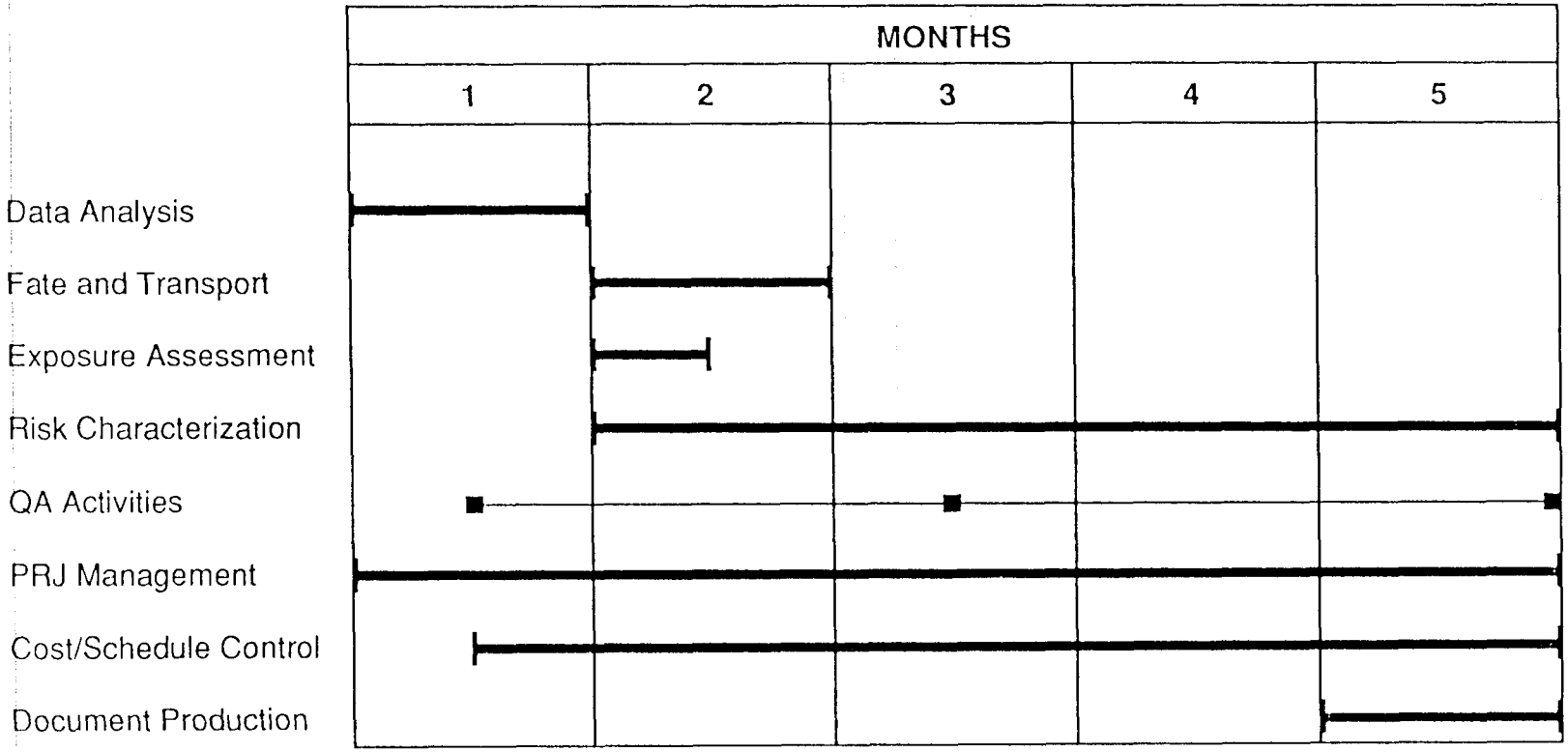
In addition, the 5-month schedule is achievable if the risk assessment can begin once data validation is complete. According to the proposed IAG schedule, data validation is complete about mid-1993. We propose conducting the risk assessment concurrently with the RA-RI report, which is proposed to begin around mid-1993 and end mid-1994. The proposed schedule presented in Attachment B shows a 5-month duration based on the above proposal of an early start date sometime in mid-1993.

FILE: OU7COST
CH2M HILL

Attachment A
COST PROPOSAL
ROCKY FLATS COST ESTIMATE; HUMAN HEALTH EVALUATION; OU2
JOB NO. DEN30180.F1.WR

LABOR CATAGORY	CY90 RATE ($/HR)	DATA ANALYSIS	FATE AND TRANSPOR	EXPOSURE ASSESS.	RISK CHARACTER-IZATION	QA ACTIVITIES	PROJECT MANAGEMENT	COST & SCHEDULE CONTROL	DOCUMENT PRODUCTION	TOTAL
E9	$67.72									
E8	$44.10									
E7	$37.14					28				28
E6	$31.25		35			28				63
E5	$27.41	35	35		11	11	28			120
E4	$23.70	35	70	35	105	42	91	91	56	525
E3	$20.64	336	70	35	112	42			84	679
E2	$18.65	336		70	112	42			11	571
E1	$17.01								11	11
E0	$14.00									0
										0
T5	$21.29				1					1
T4	$18.25									0
T3	$16.01				4				112	116
T2	$13.72									0
T1	$11.58									0
										0
OFFICE	$10.78	56			28	3	56		56	199
TOTAL HOURS		798	210	140	373	196	175	91	330	2,313
TOTAL DIRECT LABOR $		$15,594	$5,157	$2,857	$7,578	$4,894	$3,528	$2,157	$5,850	$47,615
OVERHEAD AND G & A (167% OF DIRECT LABOR)		$26,042	$8,612	$4,772	$12,655	$8,174	$5,892	$3,602	$9,770	$79,517
SERVICE CENTER (10%)		$2,604	$861	$477	$1,265	$817	$589	$360	$977	$7,952
VAX COMPUTER		$10,500	$4,200	$0	$0	$0	$0	$0	$0	$14,700
TRAVEL		$2,500	$1,500	$0	$0	$2,500	$500	$0	$0	$7,000
ODC										
Postage		$350	$175	$175	$175	$175	$175	$175	$175	$1,575
Telephone		$175	$70	$70	$70	$70	$70	$70	$70	$665
Computer		$35	$35	$210	$700	$0	$840	$0	$0	$1,820
Misc		$140	$140	$140	$140	$140	$140	$140	$140	$1,120
Reprographics		$0	$0	$0	$0	$0	$0	$0	$5,250	
TOTAL DIRECT COSTS & OVERHEAD		$57,940	$20,750	$8,701	$22,583	$16,770	$11,734	$6,504	$22,232	$161,963
FEE (8%)		$4,635	$1,660	$696	$1,807	$1,342	$939	$520	$1,779	$12,957
TOTAL EST. COST & FIXED FEE		$62,575	$22,410	$9,398	$24,389	$18,112	$12,672	$7,024	$24,010	$174,920

Attachment B - Proposed Schedule
Baseline Risk Assessment: Human Health Portion



Note:
See text for schedule assumptions.